

We claim:

1. A method of laminating a lithium or lithium alloy sheet into a thin film, said method comprising the steps of:
 - 5 -passing said sheet of lithium or lithium alloy between the meeting surfaces of a pair of working rollers to reduce the thickness of said sheet of lithium or lithium alloy to form a lithium or lithium alloy film of reduced thickness;
 - adjusting the profile defined by said meeting surfaces of said pair of working rollers to control the shape and profile of said lithium or lithium alloy film of reduced thickness being laminated;
 - 10 -removing said lithium or lithium alloy film of reduced thickness from between said pair of working rollers by applying a given tension to said lithium or lithium alloy film.
- 15 2. A method as defined in claim 1 wherein forces are applied to the end portions of said pair of working rollers such that each of said pair of working rollers bends thereby modifying the profile defined by said meeting surfaces.
3. A method as defined in claim 2 wherein said working rollers have a convex cylindrical shape adapted to facilitate the bending of said working rollers.
- 20 4. A method as defined in claim 2 wherein a pressure sufficient to reduce the thickness of said lithium or lithium alloy sheet is evenly applied onto said working rollers by at least one pair of back-up rollers.
- 25 5. A method as defined in claim 4 wherein pressure and forces are generated by hydraulic piston-cylinders assemblies.
6. A method as defined in claim 5 wherein adjustment of pressure and forces is provided through hydraulic control valves adapted to regulate hydraulic fluid debit.
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7. A method as defined in claim 4 wherein pressure and forces are generated by electric actuators.

8. A method as defined in claim 1 wherein prior to the step of passing said sheet of lithium or lithium alloy between said pair of working rollers, said lithium sheet is rapidly winded through a series of tightly packed rollers to eliminate any lateral displacement of said lithium sheet thereby ensuring said lithium sheet is fed straight into a central portion of said working rollers without any lateral weaving motion.

9. A method as defined in claim 1 wherein said working rollers are made of stainless steel.

10. A method as defined in claim 9 wherein said working rollers are coated with chrome.

11. A method as defined in claim 1 wherein said working rollers are made of plastic, acetal or ® Delrin.

12. A method as defined in claim 1 wherein a lamination lubricant is applied to the sheet of lithium or lithium alloy.

13. An apparatus for laminating a lithium or lithium alloy sheet into a thin film, said apparatus comprising:

-a lithium or lithium alloy sheet feed roller;

-a lamination lubricant dispensing unit;

-a pair of working rollers defining a lamination surface adapted to reduce the thickness of said sheet of lithium or lithium alloy to form a lithium or lithium alloy film of reduced thickness;

-adjustment means for adjusting the profile of said lamination surface defined by said pair of working rollers; and

-a winding roll for winding said lithium or lithium alloy film of reduced thickness, said winding roll connected to a driving means for winding said film under a pre-determined tension.

5 14. An apparatus as defined in claim 13 wherein said working rollers are mounted onto supporting members, said supporting members adapted to apply forces to said working rollers such that each of said working rollers bends thereby modifying the profile of said lamination surface to control the shape and profile of said lithium or lithium alloy film of reduced thickness being laminated.

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15. An apparatus as defined in claim 14 further comprising at least one pair of back-up rollers, each adjacent and in contact with one of said pair of working rollers and adapted to apply pressure onto the adjacent working roller.

15 16. An apparatus as defined in claim 14 further comprising hydraulic piston-cylinders to generate a necessary force to bend said working rollers.

17. An apparatus as defined in claim 14 wherein hydraulic piston-cylinders are mounted onto support frames to which are mounted said back-up rollers.

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18. An apparatus as defined in claim 14 wherein said working rollers have a convex cylindrical shape adapted to facilitate the bending of said working rollers.

25 19. An apparatus as defined in claim 16 wherein adjustment of pressure and forces is provided through hydraulic control valves adapted to regulate hydraulic fluid debit.

30 20. An apparatus as defined in claim 13 further comprising a straightener having a series of tightly packed rollers adapted to eliminate any lateral displacement of said lithium or lithium alloy sheet thereby ensuring said lithium or lithium alloy sheet is fed straight into said lamination surface without any lateral weaving motion.

21. An apparatus as defined in claim 13 further comprising a thin film of insulating material which is winded around the winding roller to separate layers of lithium or lithium alloy film such that they will not adhere to each other.